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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/719,582	11/21/2003	Michael Wixom	TJT-13702/16	3251
25006	7590	07/16/2004		
GIFFORD, KRASS, GROH, SPRINKLE ANDERSON & CITKOWSKI, PC 280 N OLD WOODARD AVE SUITE 400 BIRMINGHAM, MI 48009			EXAMINER WEINER, LAURA S	
			ART UNIT	PAPER NUMBER
			1745	
DATE MAILED: 07/16/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/719,582	Applicant(s) WIXOM ET AL.	
	Examiner Laura S Weiner	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 21 November 2003.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 25-49 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 25-49 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                                                                              |                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                                  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                                         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>2-23-04</u> . | 6) <input type="checkbox"/> Other: _____                                                |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. Claims 25-49 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 25 is rejected because it is unclear what n is defined as.

### ***Specification***

2. The disclosure is objected to because of the following informalities: On page 10, lines 7-8, there is no units for "The molecular weight ... approximately  $10^6$ ".

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 25, 27-32, 35, 38-41 are rejected under 35 U.S.C. 102(b) as being anticipated by Savinell et al. (5,525,436).

Savinell et al. teaches a solid polymer electrolyte membrane comprising proton conducting polymers. Savinell et al. teaches in column 2, lines 50-67, that examples of the polymers are polybenzimidazole, (PBI), polyimidazoles, etc doped with a strong acid such as phosphoric acid or sulfuric acid. Savinell et al. teaches in column 4, lines 30-35, a polyimidazole polymer in which R1 can be H, alkyl, etc. Savinell et al. teaches in column 7, lines 7-8, a fuel cell comprising the solid polymer electrolyte. Savinell et al. teaches in column 7, lines 45-63, that films of polybenzimidazole were prepared by dissolving the polymer in dimethylacetamide. Savinell et al. teaches in column 8, Table 1, the membrane conductivity measurements.

5. Claims 25, 27-32, 34-35, 37-39 are rejected under 35 U.S.C. 102(e) as being anticipated by Sakaguchi et al. (US 2004/0062969).

Sakaguchi et al. teaches a polymeric material capable of forming a solid polymer electrolyte. Sakaguchi et al. teaches an aromatic polyazole polymer such as polyimidazole in which sulfonic acid groups may be introduced. Sakaguchi et al. teaches on page 12, [0137], that the polyimidazole compound has sulfonic acid groups and/or phosphonic groups which is soluble in NMP. Sakaguchi et al. teaches on page 19, [0225], that the solvent for dissolving the resin composition containing the polybenzazole compound having sulfonic acid group and/or phosphonic acid group such an aprotic polymer solvent such as dimethylsulfoxide, NMP, dimethylformamide, diemthylacetamide, etc. Sakaguchi et al. teaches on page 21, [0257] and [0259], that the polymer was mixed with NMP and the solution was cast on a glass plate with a

thickness of 200 um and the membrane exhibited ion conductivity of 0.018 S/cm.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 26, 33, 36, 39-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Savinell et al. (5,525,436) or Sakaguchi et al. (US 2004/0062969) in view of Rasmussen et al. (6,274,724).

Savinell et al. teaches a solid polymer electrolyte membrane comprising proton conducting polymers. Savinell et al. teaches in column 2, lines 50-67, that examples of the polymers are polybenzimidazole, (PBI), polyimidazoles, etc doped with a strong acid such as phosphoric acid or sulfuric acid. Savinell et al. teaches in column 4, lines 30-35, a polyimidazole polymer in which R1 can be H, alkyl, etc. Savinell et al. teaches in column 7, lines 7-8, a fuel cell comprising the solid polymer electrolyte.

Sakaguchi et al. teaches a polymeric material capable of forming a solid polymer electrolyte. Sakaguchi et al. teaches an aromatic polyazole polymer such as polyimidazole in which sulfonic acid groups may be introduced.

Savinell et al. or Sakaguchi et al. discloses the claimed invention except for specifically teaching that the X1, and X2 of polyimidazole polymer are each CN or the polymer has a molecular weight in the range of 5000-50,000,000.

Rasmussen et al. teaches in column 3, lines 51-60, polyimidazole with cyclic imidazole monomers joined to a main chain polymer chain by linkage at the 7 position carbon and 1 position nitrogen forming an "in-chain" polyimidazole. Rasmussen et al. teaches in column 4, lines 29-56, particularly Figure 11, a 1-methyl-2-vinyl-4, 5 dicyanoimidazole which undergoes vinylic polymerization. Rasmussen et al. teaches in column 9, lines 30-35, that the polymer has a molecular weight of 140,000.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute for X1 and X2, CN instead of H because Rasmussen et al. teaches that both polymers are known and teaches that the MW of this polymer is 140,000.

#### ***Allowable Subject Matter***

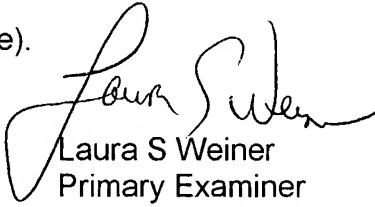
7. Claims 42-49 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura S Weiner whose telephone number is 571-272-1294. The examiner can normally be reached on M-F (6:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1745

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Laura S Weiner  
Primary Examiner  
Art Unit 1745

July 13, 2004